"Proposition for performing a series of important electromagnetic experiments" and "Why two parallel currents exert force on each other"

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As stated in the paper "Electromagnetic theory without the Lorentz transformations", in a magnetolinear medium, the magnetodynamic field arising from a current orders undiscovered tiny magnetostatic dipoles (about which we have explained there) around the place of the other current. Due to their order, a magnetostatic field proportional to the above-mentioned magnetodynamic field will be created at the place of this other current which exerts force on this other current flowing in this magnetostatic field. This is the first factor in the force between currents. There is also a second factor we explained it in the paper "Role of air pressure in the force between currents". The reasoning presented there is also applicable to the above-mentioned undiscovered tiny magnetostatic dipoles, ie their pressure, too, can exert force on the wires, but it is quite clear that because of their so tiny sizes their forces are so negligible. Pressure increment in air or each medium in which the experiment is performed will be also negligible if the currents are not so intense. Perhaps this is the case that within an extent that the currents have not yet become so intense the medium remains magnetolinear practically, ie in a linear proportion the magnetostatic field increases by increase in the current and consequently in the magnetodynamic field, but probably when the order of the tiny magnetic dipoles is saturated, ie when there is not practically any (disordered) magnetic dipole needing to get order by increase in the magnetodynamic field due to the increase in the current, then the rate of that portion of increase in the force between the currents which is due to the first factor decreases because in such a state (because of the above-mentioned saturation) increase in the field intensity being arising from the influence of current of the first wire at the place of the second wire has no role in this increase of force which only is gained by increase of current in the second wire. But there exists no such state of deceleration for the second factor, and any increase in the current and consequently in the magnetodynamic field causes more magnetic dipoles to be attracted and pressed and consequently exert bigger force on the currents.

There is also a third factor in the force between currents clearly having very very negligible role. It is introduced at the end of the paper "Role of air pressure in the force between currents".

Choose two parallel wires. We know if these wires carry parallel currents they attract each other, and if they carry antiparallel currents they repel each other. Existence of this attraction or repulsion doesn't concern the medium of experiment, ie if the experiment is performed in air, nitrogen, natural gas, water, vacuum or other mediums yet this attraction or repulsion exists. Will the magnitude of this attraction or repulsion increase if this experiment is performed in a ferrofluid? It seems that this will be the case, because the magnetic field arising from the current in a wire at the place of the other wire polarizes ferromagnetic tiny particles of the ferrofluid near around this other wire and gives order to them in such a manner that the magnetic field at the place of this other wire will be strengthened (like when the existence of a ferromagnet core in a solenoid strengthens the magnetic field arising from the current in the solenoid), so, the force exerted on the current in this strengthened magnetic field will be more. This experiment doesn't seem to be performed so far and neither have I possibility to perform it presently. My FIRST PROPOSITION is that if you have access to necessary experimental facilities perform this experiment to see whether or not the mentioned attraction or repulsion will be strengthened in a ferrofluid medium.

Now, consider two current-carrying parallel wires in the air or in a vacuum. Measure the force that these two wires exert on each other when specified currents flow through these wires. Now without any change in the conditions of experiment (esp current intensity) other than the kind of the wires change their kind into a soft ferromagnetic material (like iron). In this state each wire positioning in the magnetic field arising from the current in the other wire will become itself polarized and oriented laterally in such a manner that will strengthen the magnetic field arising from the current in the other wire near around itself. But this strengthened magnetic field cannot cause increase in the force exerted on the wire if the medium surrounding the wire lacks (inductive) magnetic dipoles (as we cannot say that there is a net force exerted on a (point) charge due to the placing of that charge in the field arising from itself). But if the (soft) ferromagnetic wires are placed in a ferrofluid, ferromagnetic particles of the ferrofluid will become more polarized and more oriented in this strengthened field and then the magnetic field in the place of the wire will be strengthened due to this more polarization and orientation of the particles, and so, the force exerted on the current-carrying wire in this field will increase. SECOND PROPOSITION is that firstly measure the force exerted on some non-magnetic current-carrying parallel wires placed in ferrofluid and secondly through the sole alteration in the conditions of the experiment change the kind of the wires into a soft ferromagnetic material and measure the force exerted on the wires and compare it with the previous one. Do this experiment and let us know the result for proper analyzing.

THIRD PROPOSITION is performing just this experiment in the air or in a vacuum, ie in a medium (seemingly) lacking (inductive) magnetic dipoles measure the force between two parallel current-carrying non-magnetic wires and then only change the kind of the wires into a soft ferromagnetic material and measure again this force and compare it with the previous one. According to what expressed before, the force is not expected to increase by changing the kind of wires, but do this experiment with much more carefulness and let's know the result since probably after changing the kind of wires into a soft ferromagnetic material the force between them will increase (even though through a very small increment). If this will be the case and you will report the details of your experiment, you will share in the theory proposing this experiment (about the existence of undiscovered tiny dipoles mentioned in the paper "Electromagnetic theory without the Lorentz transformations").

Now laterally magnetize a wire of a hard ferromagnetic kind in a so powerful magnetic field permanently. Situate this magnetized wire in a ferrofluid in a straight position. Theoretically the magnetic field of the magnetized wire will polarize and orient the ferromagnetic particles of the ferrofluid around the wire in such a manner that the wire will be in the lateral magnetic field of them. Now, if we pass a direct electric current through this wire it will be expected that there will be a force exerted on this current-carrying wire being placed in the above-mentioned magnetic field (due to the oriented ambient inductive magnetic dipoles of the ferromagnetic particles of the ferrofluid). FOURTH PROPOSITION is performing this experiment and observing that whether or not really there will be force exerted on this current-carrying (laterally) magnetized wire in a ferrofluid. Perform it and report its result and details for analyzing.

As the FIFTH PROPOSITION perform this same experiment (subject of the fourth proposition) in a medium having (seemingly) no (inductive) magnetic dipoles (effectively), eg a vacuum or the air, without any other alterations to the conditions of the experiment (esp that the wire must be permanently magnetized). According to the same reasoning that a charge doesn't exert any net force on itself it is not expected that any force will be exerted on this current-carrying wire (in vacuum), but perform this experiment with much more carefulness since it is probable that in this state too there will be a force (even though weak) exerted on the (magnetized) wire after passing of current through it. If this will be the case and you will report the details of your experiment you will share in the (same mentioned) theory proposing this experiment.

See below for the SIXTH PROPOSITION:

Take an opaque hollow insulator cylinder (ie a thick tube). Make a vertical small hole in the body of this cylinder at one (and only one) point at an equal distance from the two circular bases of it. Choose another short rigid tube and fix and fit and seal one of its bases in the above-mentioned hole. In this manner you will have a T-shaped complex of two communicating tubes from which the narrow tube is normal to the middle of the thick tube. Coil an insulated wire round the thick cylinder (or tube) equally balanced at two sides of the narrow perpendicular tube. Free end of the narrow tube must be out of the coil. Give a (strong) direct electric current to the coil and suppose that some imaginary entities are being shooted through this narrow tube outwards while we are giving current to the coil. Consider the trajectory of these shooted imaginary entities along and in the continuation of the narrow tube which we call it here, when we are giving current to the coil, as the "line of experiment".

If you have access to experimental facilities for determining or comparing light velocities in different directions or mediums directly (eg by using Michelson-Morley experiment in Michelson interferometer) or indirectly (eg by study on effects of alteration of index of refraction on a beam of light), please perform necessary experiments to see if the velocity of light in the (above-mentioned) line of experiment differs from one in a direction normal to this line. Please let me know the result of your experiment. If it differs and you report the details of your experiment you'll have a share in the important theory proposing this experiment.

We know that there exists a force exerted on a current-carrying wire in the space between the two flat poles of a U-shaped magnet when it is normal to the lines of magnetic field. Suppose that this force is outwards. As a high school experiment suggests let's rest this magnet on a sensitive balance. In this state the above-mentioned wire in the space between the magnet poles will be horizontal and we hold it to keep its horizontal state. Now if the same current with the same direction passes through the wire, still the same outward force, which in this state is also upwards, will be exerted on the wire. However we observe that the sensitive balance indicates an additional downward force exerted on itself. This additional force is the reaction force of the (action) force exerted on the wire which is being exerted on the magnet.

Exertion of action and reaction forces is also observable in the following experiment which we call it as Experiment "a" here: Take two strips which are laterally permanently magnetized. Hang them from above beside each other in such a manner that there exists a narrow gap between them and near edges of the two (laterally) magnetized strips are opposite poles of them. Hang an insulated wire in the above-mentioned gap and pass an intense direct current through it. So, the strips are forced in a direction (normal to the surface of the strips) and the wire is forced in the opposite direction. These drivings of the wire and strips will be reversed when the direction of the current is reversed.

Clearly this experiment is a result of the action-reaction law.

Now in the recent experiment (ie Experiment “a”) suppose that the covering of the insulated wire has been stuck to the above-mentioned near edges of the two strips such that the strips and the wire form a rigid set of clung three things. Let’s repeat the experiment in this state and call it as Experiment “b”. The force exerted on the wire and the force exerted on the strips will cancel each other and no net force will be exerted on this set. (In other words if we have a wire of a hard ferromagnetic material and we permanently magnetize it laterally in a powerful magnetic field and then hang it in a space (seemingly) free from any external magnetic field and pass a direct current through it, we shouldn’t expect any net force exerted on the wire although the wire is a (lateral) magnet. (This is the subject of the fifth proposition.)) But it seems that this is not quite the case, and when the current is passing through the wire there is a force (even though weak) exerted on the set in the same direction which was exerted on the wire before sticking it to the strips. Perform this experiment in a medium considered as one lacking magnetic dipoles as a different repeat of the fifth proposition. If you can show the existence of such a force exerted on the above-mentioned set, report the details of your experiment and share in the theory presenting this experiment.

A quite fundamental question: Suppose that in Experiment “a” the magnetic field has not been created by the magnetic strips but it is due to the interior space of a current-carrying coreless solenoid. In other words let’s take the strips and substitute a solenoid. If so, where will the reaction of the force exerted on the wire be exerted directly? If it is exerted on the solenoid, which part of the solenoid is enduring it directly (notice that in the case of the original experiment “a” the reaction force is exerted specifically on the inner poles of magnetic strips)? It seems that this reaction is exerted directly on oriented magnetic dipoles in the interior space of the solenoid, and since even in a vacuum there exists force exerted on the current-carrying wire in the magnetic field inside the solenoid, we should conclude that (undiscovered tiny) magnetic dipoles exist in this space even evacuated traditionally of air. If similar to Experiment “b” we stick the wire to the solenoid and when the current is passing through the wire there exists a force (even though weak) exerted on the set in the same direction which was exerted on the wire before sticking it to the solenoid, we must conclude that the reaction of the force exerted on the wire is exerted on the (so tiny undiscovered) magnetic dipoles of the space inside the solenoid not directly on the solenoid body.

SEVENTH PROPOSITION: In the recent experiment (ie the alternative repeat of the fifth proposition) use the inside space of a current-carrying coreless solenoid instead of the magnetic strips. Namely, pass an insulated straight wire laterally through a sufficiently big coreless solenoid and fasten the wire and solenoid together. Now hang the wire vertically while the solenoid, which is normal to the wire, remains stuck to the wire. A direct current passes through the solenoid and then the magnetic field inside the solenoid is constant and normal to the wire. Now let an intense direct current pass through the wire. If the situation is similar to the experiment proposed in the alternative repeat of the fifth proposition, no net force will be expected to be exerted practically on the clung set of the wire and solenoid; but perform this experiment and if you observe some noticeable net force exerted on this set in the same direction of the force exerted on the straight wire in the inside field of the solenoid, report the details of your experiment and share in the theory proposing this experiment.

As an alternative repeat of the experiment of the seventh proposition, instead of being fastened together let the solenoid rest along its length on a sensitive balance and the straight wire pass laterally through the solenoid in the middle of its length while having no touch with the solenoid. Keep holding this wire horizontally. Suppose that when direct currents are passing through the solenoid and wire, the wire is being forced upwards. If the situation is similar to what said about a free wire between two free laterally magnetized strips we should expect reaction of the upward action force exerted on the wire to be a downward force exerted on the solenoid causing the balance to indicate noticeably the additional force exerted on it. But probably practically this won't be the case because of the reason presented in the section "A quite fundamental question". Perform this experiment and in the case of confirmation of this probability report the details of your experiment and share in the theory proposing this experiment.

EIGHTH PROPOSITION: Two current-carrying parallel wires, in the air or in a vacuum, exert force on each other. The magnitude of the force exerted by the first wire on the second wire is theoretically and experimentally equal to the force exerted by the second wire on the first wire, and this is in accordance with the action-reaction law. Now let one of these two parallel wires be in a ferrofluid and the other one be in the air or a vacuum. In this state when the same currents flow in the wires, the forces exerted on the wires will be expected to be in the same directions as before, but will the magnitudes of these forces be equal to each other? Perform this experiment and compare the forces exerted on the wires with each other. Probably the force exerted on the wire in the ferrofluid will be more than the force exerted on the other wire. If so, what can be said about the action-reaction law in this respect? Perform the experiment carefully and report the result for analysis.